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An Improving Development of the Harmonics Losses and Bearing Load for Motorized High Speed Spindle

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Abstract

Angular contact bearings are the most popular type of bearings used in the motorized high speed spindle. An initial preload and operating-induced load control are managed to ensure its rigidity, but the centrifugal force and temperature will rise with the rapid increase of spindle speed. Although the centrifugal force and thermo induced bearings load are applied to the spindle assembly, this paper aims to study innovative structure solution of spindle and develop a new type of super precision bearings which will ensure the lifetime and high performance of spindle. In this paper, an improved inverter output filter is designed for pulse width modulated (PWM) drive system,. The proposed filter is shown to effectively reduce the power losses in the spindle. This usage of the filter can improve lifetime of bearings and gain a higher output power of the spindle. We are convinced that the filter configuration will have an excellent contribution to PWM drive system.

Key words：Centrifugal force;Inverter output filter;

Pulse width modulated drive system